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RE-ENGINEERING OF EXISTING PROCUREMENT PROCEDURES IN CYFIELD

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ABSTRACT

RE-ENGINEERING OF EXISTING PROCUREMENT PROCEDURES IN CYFIELD

(Under the academic advice of Dr. MARIOS THEODOSIOU)

In the current competitive business environment, effective and efficient procurement procedures within an organisation can dictate the extent of its success. The recent economic crisis, the stricter regulations as well as the changing technologies make procurement a multi-disciplinary process that requires integration in the overall business structure to achieve value for money purchases. Due to the complexity of this process as well as its commercial sensitivity and potential internal or external fraud, the process should be digital for more control.

This paper aims to evaluate the effectiveness of the current procurement practices within Cyfield as well as to introduce recommendations for the re-designed process. The re-engineered process includes a stricter flow of information from different departments, a revised hierarchy of approvals and the preparation of written contract/agreement for each purchase agreed. This new process is proposed to become an electronically based procedure, with the goal to render the process more efficient in its entirety.

The re-engineered process emanates from the thorough investigation of the existing processes, the culture within Cyfield and the current environment in the construction industry in Cyprus. The aim of this proposal is to provide an efficient and effective procurement process within Cyfield and be implemented in a way that will be accepted and embraced by the current employees.

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ABBREVIATIONS

ABP	Applied Business Project
AD	Accounting Department
BoQ	Bill of Quantities
PD	Procurement Department

Chapter 1

INTRODUCTION

The need to ensure efficiency in procurement processes and run a well-established Procurement Department (PD) has become increasingly important for businesses around the world. This Applied Business Project (ABP) examines how the reorganization of the PD can enhance the efficiency of operations of a market leader company, 'Cyfield Group of Companies'.

During the last two decades, there is evidence in the literature of increasing use of web-based technologies in the execution of procurement activities related to the construction industry. This is primarily to facilitate efficiency and effectiveness as well as to minimise potential fraud as this is a commercially sensitive topic for every business. However, compared to the manufacturing, retailing, and other service industries, the construction sector is generally slow in the employment of technological innovations regarding procurement, such as the creation of a common database within the company[1]. This evidence indicates that even though there is a plethora of electronic tools that a construction company could employ many organizations have yet to take advantage of the potential benefits.

Some of the factors that may hinder the development of the procurement procedures in the construction industry include limited investments in new technologies within the companies as well as the short term view of contractors along with the conservative nature of procurement in the industry (Laryea & Ibem, 2014). In this study we examine the factors

[1] Laryea, S. & Ibem, E. (2014). Patterns of technological innovation in the use of e-procurement in construction. Journal of Information Technology in Construction, 19, 104-125.

that may have prohibited the adoption of technology-based solutions in the PD and we analyse how Cyfield can benefit from the restructuring of the proposed changes.

Objectives of ABP

The current ABP aims to evaluate the effectiveness and efficiency of the current procurement practices of Cyfield construction company, and present a detailed plan for the re-design and implementation of new – electronically based – procedures. The ultimate objective is to render the process more efficient in its entirety.

The Company

The Cyfield Group is an integrated Group of companies, and one of the key players in the construction industry in Cyprus. Over the years, the company has grown from a small family business into one of the largest construction businesses and the main competitor in the industry. The firm continues to grow with a long list of executed projects in its portfolio, technical experience, and financial strength[2].

In 1990, Cyfield started as a real estate development and construction company. In the early 2000s, Cyfield evolved into a long-established firm with well-known reputation, due to the successful execution of many residential and commercial projects. In 2001 Cyfield acquired the Nemesis Construction, which was one of the main infrastructure contractors, who had severe financial issues at the time. This acquisition significantly strengthened the financial position of Cyfield and diversified the operation field of the company. During the past few years, Cyfield has entered into energy production by building solar power plants and developing the first private energy power plant in Cyprus.

Cyfield is known for the establishment of new architectural trends, the introduction of new technologies, which ensure building quality, as well as their after-sale customer service. This innovative way of operating enables them to ensure proper project execution under strict quality and performance standards (Cyfield, 2020).

The group of companies is serving both the private and public sectors, and operate in the

[2] Cyfield Group of Companies. (2020). About us. Cyfield. https://cyfieldgroup.com/

areas of:

- Real estate development
- Contracting
- Manufacturing & Trading
- Energy

Company Mission and Vision

The company's mission is to create projects that benefit both individuals and corporations as well as to define the way forward, while establishing a lasting impact on the community[3]. Cyfield directors highlight that they managed to combine the family values with the standards of a sophisticated enterprise, which facilitated the development of a distinct corporate culture that gives them a unique competitive advantage.

Their mission is characterized by a strong belief in corporate values, as they established the below fundamental principles to be part of their organizational mindset. Their values are characterized by a clear orientation to the client. In Cyfield they approach every customer, associate, or collaborator individually, according to their individual needs. Through the years, they have managed to become reliable and transparent by delivering their promises and honoring every contractual obligation, including the timeframe and monetary aspects of each project. They have also strived to build and maintain strong and enduring relationships with every associate, based on high ethical standards, honesty, and trustworthiness. Lastly, Cyfield invested in the development of their personnel and established their Group of Companies by creating an inclusive environment for its people that come from diverse backgrounds.

Cyfield adapts rapidly to changes and challenges in the marketplace and delivers enduring results for clients. Their vision is "to embark on innovative ventures and break new grounds with pioneering projects to become one of the Region's leaders in the real estate development, infrastructure construction, and energy" (Cyfield, 2020).

[3] Cyfield Group of Companies. (2020). About us. Cyfield. https://cyfieldgroup.com/

Definition of Procurement

It is worthwhile specifying how procurement is defined for the purposes of this ABP, prior to proceeding with the discussion and analysis on the various topics. Procurement is a process that occurs in almost every business, either as a conscious response of a larger department, or unconsciously, as part of its normal flow of operations. In simple terms, the procurement process is how an organization executes its plan to acquire the goods and services needed in order to continue its operations without disruptions. For certain companies, procurement can be a straightforward venture without riddles or complexity, but for some others it can be complicated, as it requires maximum scrutiny, dedication, and engrossment.

Several research studies explain the notion of e-procurement with different terms, but the overall principles are very similar. The focus of e-procurement process is in the discovery, evaluation, and selection of the most appropriate suppliers/subcontractors for each project. It, also, entails the reduction of costs, but, at the same time, it ensures high quality of the deliverable products or services, through accurate selection and scrutiny of the potential suppliers[4]. The same study continues that e-procurement is a convenient ICT tool that allows construction stakeholders to plan, control and increase productivity throughout the cycle of a construction project.

Additionally, the majority of the sources explain that construction procurement is a process that involves several steps and activities, when procuring construction goods, services and works. For instance, ISO[5] noted that construction procurement involves three main activities: creating, managing, and fulfilling contracts, in relation to the supply of construction of works. The six basic construction procurement activities identified by ISO include:

i. Establishment of what is to be procured
ii. Establishment of procurement strategies
iii. Soliciting for tender offers

[4] Vitkauskaite, E. & Gatautis, R. (2008). E-procurement perspectives in construction sector SMEs. Journal of Civil Engineering and Management, 14(4), 287-294.

[5] International Organization for Standardization. (2010). Construction Procurement-Part 1: Process, Methods and Procedures. ISO, 10845(1).

iv. Evaluating tender offers
v. Awarding of contracts; and
vi. Administrating contracts to ensure that they comply with requirements

The extent to which each of these activities is executed and taken into consideration in a particular attempt for procurement is determined by the system adopted by each company as well as by the needs and requirements of a particular construction project.

These insights provide the reader with a clear idea of e-procurement; however, one should investigate details from past literature in order to acquire an accurate and holistic depiction of what the notion of procurement entails in regard to the construction industry.

Structure of ABP

Chapter 2 of this ABP includes a description of the external environment within the construction industry in Cyprus as well as the factors that require a more effective PD within the construction industry. Additionally, Chapter 2 includes a depiction of the current procurement processes currently pursued within Cyfield along with their benefits, limitations, and areas for improvement. In Chapter 3, the team presents a step-by-step procedure to be followed for the improvement of the procurement procedures and in Chapter 4 we present the implementation steps along with the expected results from the introduction of the new norms within the culture of the organization. The financial impact of the proposed re-design is also of great importance to the company and, therefore, is analysed in Chapter 5 of this ABP. A contingency plan is presented in Chapter 6, which identifies the risks and provides an alternative route in case the proposed re-engineering plan does not proceed as expected. Finally, Chapter 7 includes significant conclusions described by the team along with the main benefits entailed for Cyfield.

Chapter 2

ANALYSIS OF EXISTING PROCUREMENT PRACTICES IN THE CONSTRUCTION INDUSTRY & CYFIELD

Evaluation of external environment

Construction projects can vary from buildings to infrastructure with a huge number of materials and service providers to be procured for its successful completion. Materials required to be procured can be standard such as concrete, steel, cement, aggregates, aluminium, or more complex such as electromechanical equipment. The procurement of the construction projects can be split to two areas: materials and service providers (subcontractors) each equating to approximately 50% of the total construction cost. Hence, it is equally important to establish an effective procurement for both materials and service providers.

The profit margin of construction companies is limited to 3-5%, but significant earnings can be achieved due to the high turnover from each project. The risks of construction projects depend on the type of contract between the client and the contractor, but generally construction is deemed to have significant risks in terms of accurately pricing and executing the projects. With the narrow profit margins and the relatively high risk, it is critical to have an effective procurement of materials and suppliers, as a minimum saving (i.e. 1%) can have a significant impact compared to the margin.

The current economic environment is also a parameter that enhances the importance of an effective procurement within a construction company. The recent economic recession has forced the suppliers to request down-payments to secure the purchase before the delivery of the goods or services. The down-payment provides a security to the supplier, but it is a risk for the contractor, as in terms of reliability of the delivery and, also, it creates a cashflow issue. Hence, many contractors request bank guarantee before providing the down-payment. This is turn, links the procurement of materials to the banking sector which is becoming very

strict in approving and providing these guarantees. As the effect of the recent economic recession have these consequences in the procurement of construction materials and services, the recent Covid-19 pandemic amplifies these risks and the need to negotiate the payment terms in order to minimise the risks for the supplier, the contractor, and the banking system.

Over the last couple of decades people have become more aware of health and safety as well as environmental issues both in their personal and professional life. These aspects are covered under strict legislation that companies need to obey. Therefore, during procurement of materials and services, it is vital that the agreement transfers the responsibility to obey with these laws to the supplier. Hence, evaluation of potential suppliers and subcontractors should take into consideration the compliance with the law and legislation as well as the financial and quality aspects of the offer.

Technological advancement in the construction industry is significant especially in the production of new materials. Being up to date with the new technologies and introducing new materials in the market is essential to have an active procurement department so that potential opportunities can be identified. To evaluate the potential opportunities of new materials, the assistance of the engineering team will be essential in order to evaluate the technological characteristics and their applicability.

Evaluation of the micro-economics for the local Cypriot economy is equally important in order to identify the need for an efficient and effective procurement department. The prices of the materials and service providers in the Cypriot construction industry are primarily driven by the demand for work. During times of economic evolution, the prices given are high and without intensive negotiations the organization may end up with an expensive deal. In addition, with Cyprus being an island, most of the materials are imported and, hence, the suppliers depend on the shipping industry in regard to the transport cost as well as the delivery times. Hence, for effective and on-time procurement need to be taken into account by such a department.

The current recession that the economy is expecting to enter due to the combination of Covid-19 as well as the termination of the Cyprus Investment Programme is expected to make procurement even more important. Due to the reduction in the demand for real estate,

the prices will need to be reduced in order to be more competitive and, hence, reduction of the construction costs is critical for those who will survive. In addition, as the number of new projects is expected to be reduced, more subcontractors will be available for work and, therefore, it is a good opportunity to enrich the portfolio of subcontractors in an attempt to increase the quality of the finished product as lower cost, due to the limited works available.

The evaluation of external environment including the micro and macro-economics is critical in establishing the importance in the development of an effective, efficient as well as agile procurement department in one of the leading firms in the construction sector of Cyprus. The challenging times we are experiencing at the moment, in terms of financial crisis, as well as the exponential increase of available materials and technological advancement make the procurement sector the heart of the organisation, both in terms of monetary as well as engineering value.

Description of current practices in Cyfield

In order to evaluate the effectiveness and efficiency of the current procurement practices within Cyfield, the team arranged and conducted several interviews with key personnel in the firm. Appendix I shows basic discussion prompts that enabled the team to elicit information from the interviewees. These interviews provided valuable understanding of how the current mechanism operates as well as the advantages and disadvantages of these procedures. They also offered a clear understanding of the company's culture and helped us identify potential pitfalls that may occur during the implementation process. The personnel that was selected to be interviewed from the company was the following:

- Kyriakos Chrysochos (Founder)
- Christos Christou (Director of Development Department)
- Andreas Constantinides (Director of Contacting Department)
- Panayiotis Constantinou (Head of Tendering Department)

The information obtained from each interview allowed the team to understand not only the bigger picture of the current procurement in Cyfield, but to comprehend the details and the rationale behind each action, procedure, and final decision. The aforementioned personnel provided the team with a thorough description of the current practices, answered to questions, and made the necessary clarifications in order to communicate their message

accurately. An analytical evaluation of the data collected from the interviews is followed in the next section.

The initiation of the procurement process, for material or services, starts on the project's commencement date and it continues through its life cycle until completion. Once the need for procuring is identified by the Project Manager, all the relevant information is compiled, including drawings, quantities, and specifications. This information is sent to suppliers or subcontractors that the Project Manager knows, mostly because they had worked with Cyfield on previous projects. It is highly unlikely that the Project Manager will undertake an extensive market search to identify new suppliers or subcontractors to initiate a new collaboration. The tender information is disseminated for tendering via email, or even described orally over a phone call, with no formal or written procedure.

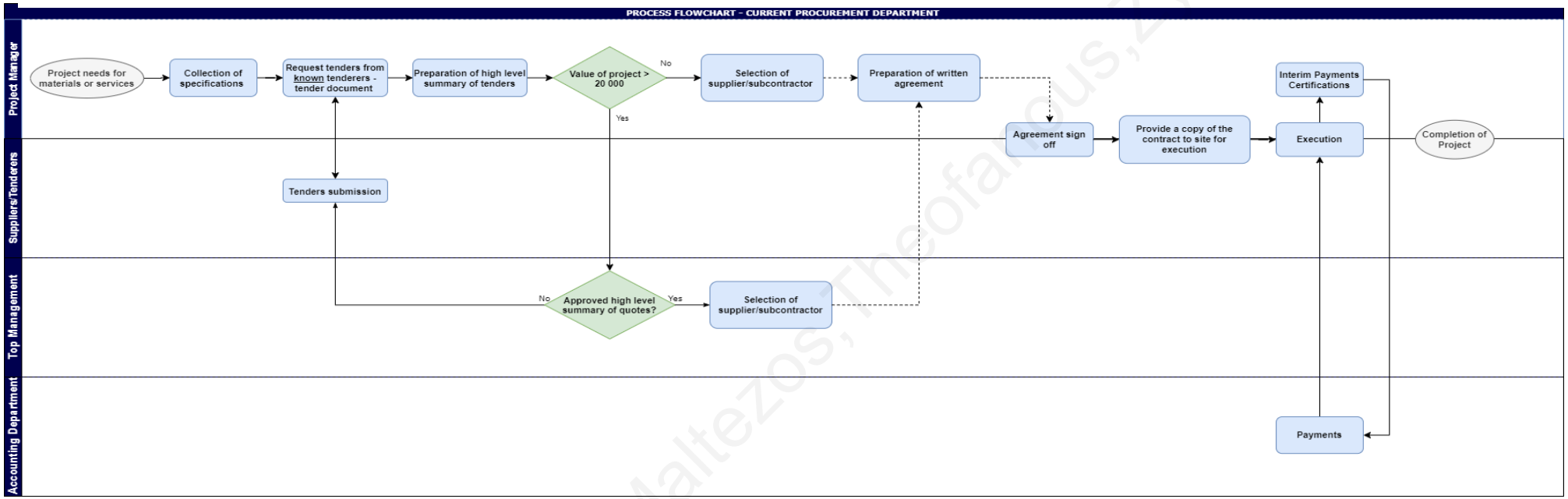
The tenders are then received in either explicit offer or just as a lump sum through an email or a phone call, depending on the value and complexity of the products or works to be procured. At this stage, depending on the negotiation skills of the Project Manager, negotiations may or may not take place regarding the cost of the material or service. It is very rare that negotiation takes place in terms of delivery times, terms of payments, or other non-monetary aspects of the agreement. Depending on the value of the package under procurement, the approval of the CEO may be requested, otherwise the Project Manager proceeds with the agreement of the package. In either case, an agreement document is not always signed and documented. The lack of agreement has created several issues with the suppliers/contractors, in the past, especially in cases when the agreement was terminated mainly due to a conditions breach.

Following the verbal or written agreement between Cyfield and the supplier/subcontractor, the operations are executed and every two weeks the Project Manager is responsible to measure the work delivered and send a payment certificate to the Accounting Department (AD) for payment. The AD does not always have visibility of the agreement between the supplier/subcontractor and, hence the prices can only be checked with the relevant Project Manager who made the agreement. In addition, as the payment terms are not always negotiated and explicitly stated in the agreement, in many cases there are different expectations between the two sides, resulting in issues that in some cases can entail agreement termination or even reach a closure in court.

What is crucial to understand is that the execution of the current procedures is based on the expertise of the existing and well-experienced staff. These Project Managers, for instance, are able to assess the suppliers/subcontractors and reach an agreement with them based on their negotiation skills, their previous cooperation, and the network they have built over the years. This implies that the current model would dysfunction or underperform in the case of new recruitments or when members of the key personnel leave the company.

The existing procurement procedures described above are indicated in Figure 1 below.

Figure 1: Flow chart of current procurement practice



Evaluation of data collected through interviews

As mentioned in the previous section, the interviews conducted with the key personnel provides a description of the current practices and also shed light on some of the drawbacks of the current system. At the same time, specific issues were raised regarding the viability of a possible PD, due to previously unsuccessful attempts by the management to establish such a department.

During all the interviews the feedback received was similar: the current practices have disadvantages that cannot be omitted. The lack of a centralised procurement database in Cyfield has the following consequences for both the individual projects and the company as a whole:

- Time-consuming processes and increasing pressure on Project Managers to undertake procurement of common materials/services, independently for each project

In most cases, the project manager has a tight deadline to deliver the project to the customer, which eventually adds increasing pressure to the whole construction process. Currently, the Project Managers are obliged to identify and select for suppliers/subcontractors on their own, which leads to increasing pressure and additional work to their already hectic duties.

- Lack of market research prevents new collaborations, which may obstruct improvement in the quality and cost of works

In addition, it is very rare for the Project Manager to undertake research on the market to identify new opportunities for collaborations. The lack of time to engage in supplier search is an important factor that eventually results in choosing the same suppliers/subcontractors repeatedly.

Moreover, in certain cases, Cyfield terminates its agreements with hired suppliers/subcontractors that breach the terms of contracts. Due to the absence of a database to keep track of all the suppliers/subcontractors available, as well as the lack of their formal evaluation after the completion of each project, often results in choosing the same suppliers/subcontractors to work in other companies of the Group. Apparently, the

absence of a centralized system leaves the companies of the Group unaware of such incidents, which results in significant financial loss for the business. Therefore, the same suppliers/subcontractors are eventually rotating into several projects of the organisation leaving alternate choices of suppliers out of the game.

- Lack of communication between the tendering and delivery team in regard to the procurement

Another important conclusion that emerged from the interviews, is that each project manager is working independently from each other within the organization. As soon as a Project Manager is assigned with a project, several tenders from known suppliers/subcontractors must be collected in order to finalize a total price for the project. However, this procedure is lengthy, as it may take several weeks or months to be completed, depending on the scale of the project. The lack of a well-organised and centralized system, with historical data stored into a database system concerning other finished projects, eventually leads Project Managers to encounter several duplications with other project managers when completing the process of getting the needed information.

- Inefficient reuse of common, excess materials after project completion resulting in increased waste

Another concern that was revealed is how the company deals with the excess materials remaining after the completion of a project. The interview data highlighted that a more efficient waste management approach could have brought significant monetary gains to the organisation. Currently, the extra supplies that remain after a construction is completed are transferred into a warehouse. However, the main concern of Project Managers is that these supplies are not regularly used, thus are left there for a very long time until they expire or later thrown away. There is no centralised system that is linked to the warehouse in order to guide and inform the Project Managers about these supplies in order to utilize them for future projects.

- Lack of communication by the top management to highlight the importance of a new strategic centralised procurement department

Several failed attempts were previously made in order to establish a self-regulated PD within the organisation. Although employees in the organisation know exactly the potential value of creation with such an implementation, wrong planning and managerial controlling, incorrect choice of people or even the demanding market of Cyprus were several obstacles in the process. In order to improve the procurement department of the organisation, the managing directors must communicate clearly the values, cultural changes, aims and objectives of such an investment that both managers and employees must follow with respect.

SWOT analysis

For the description of the current procurement practices at Cyfield, an internal strategic planning technique framework, SWOT analysis, will be used in order to identify strengths, weaknesses, opportunities as well as threats as shown in Table 1. The internal analysis helps the organization to identify areas of growth or revision in order to form a practical business strategy.

Table 1: Swot Analysis

Strengths	Weaknesses
▪ Economies of scale ▪ Assisting the project manager ▪ Evaluation of suppliers/subcontractors' performance ▪ Centralized database system ▪ Audit & control of processes ▪ Sharing of experience for continuous development ▪ Strong capital base & finance ▪ Advanced project management ▪ Reduction of costs	▪ Strict procedures to follow ▪ Quick expansion (new recruitment) ▪ High start-up costs ▪ Resistance of workers towards adoption of new methods ▪ Incapability of workforce to adjust with modern type of formwork
Opportunities	**Threats**
▪ Huge cost savings ▪ Efficient & audited procedures ▪ Developed contract agreements ▪ Increased market search ▪ Market evaluation ▪ New modern suppliers & subcontractors ▪ Increase fraud control ▪ Developing a functional & coordinated project team ▪ Reliable centralized system ▪ Research & Development ▪ Sustainability & environmental protection standards	▪ Increased responsibilities & procedures ▪ Bottlenecks ▪ Lack of communication by top management ▪ Loss of control of the system & direction ▪ Unauthorized access to the system

Cyfield has managed to build and develop a strong and dominant presence in the construction industry throughout the years. Following the long establishment along with the rapid growth of the organization, the company benefits from economies of scale. The sharing of experience for continuous development, the advanced project management philosophy along with the strong established capital base in the market are the leading strengths for the success of the organization. The development of a new centralized system in the PD can help the organization to continuously audit and control processes by assisting the Project Manager's work as well as by evaluating the performance of suppliers and subcontractors

involved in each project. The new centralized system will also create a key database port in order to record the necessary information used during every construction development. As a result, this information can be used in order to benefit the organization from efficiency and multiple cost savings for future projects.

In contrast, the development of the e-procurement will also hold several weaknesses which will shock the internal environment of the organization. In particular, the implementation of the centralized system will involve new recruitments and imply high startup costs. The organization must effectively structure the development of the department by hiring new suitable employees that will fit to the development and objectives of the centralized system. In addition, strict procedures must be followed and led by the top management in order for the implementation to be successful. As a result, resistance of workers towards the adoption of new processes will eventually appear to point another important weakness of the system. Employees that are stuck to the traditional method may be not able to adjust easily with the modern type of formwork that would be necessary for application.

The current analysis of the internal environment presents several opportunities with the implementation of the new procurement system. The main opportunity presented is the significant cost savings achieved by the development of a new centralized system with efficient procedures, audited processes, and developed contract agreements. As a result, the new centralized system will have a wider access to market search in spotting, identifying, and examining new modern suppliers and subcontractors that could become potential partners for the company. Increased market evaluation will also be achieved by the new electronic procurement database as each subcontractor or supplier involved in a construction project will be evaluated at the end of the work. Therefore, the new centralized system will create a developed and evaluated image of the market that will assist the department to develop a strong functional team by choosing to hire intelligent and efficient suppliers to work with. Another important opportunity of the new centralized system is the increased fraud control. Processes and procedures will be audited systematically by the current operators of the new centralized system in order to verify that everything is working correct. Unfavorable actions will be controlled and eliminated as they will show abnormalities to the system.

The implementation of the system will also involve some critical threats for the company. To begin with, the development of the new centralized system will create a completely new modern type of work with increased responsibilities and procedures. Employees must be able to adjust easily to the new system in order for the implementation of the system to be effective and successful. Another critical threat of the new system are the bottlenecks that could be created with the implementation of the system. In addition, bottlenecks will have a huge impact to the performance of the department driving inefficiency to processes and procedures. Also, the lack of communication by the top management to describe the successful and strategic direction of the new system can present another important threat of the organization influencing the failure of the system. Unauthorized access to the system is considered another key threat with the implementation of the new system. In particular, unauthorized access can signal warnings of fraud and loss of data.

Chapter 3

RE-ENGINEERING OF PROCUREMENT PROCEDURES

Objectives of the proposed model

Following the thorough evaluation of the current procedures and the extensive interviews with the key personnel in Cyfield, the conclusion is that a more formal procedure can be used in order to improve the process. The current process has some strengths due to the extensive experience of key people within the company but with their support and a more formal and structured procedure this can have incremental benefits to the company.

For the purpose of presenting the proposed re-engineered procurement model at Cyfield the process will be split in three phases which will be analysed in order:

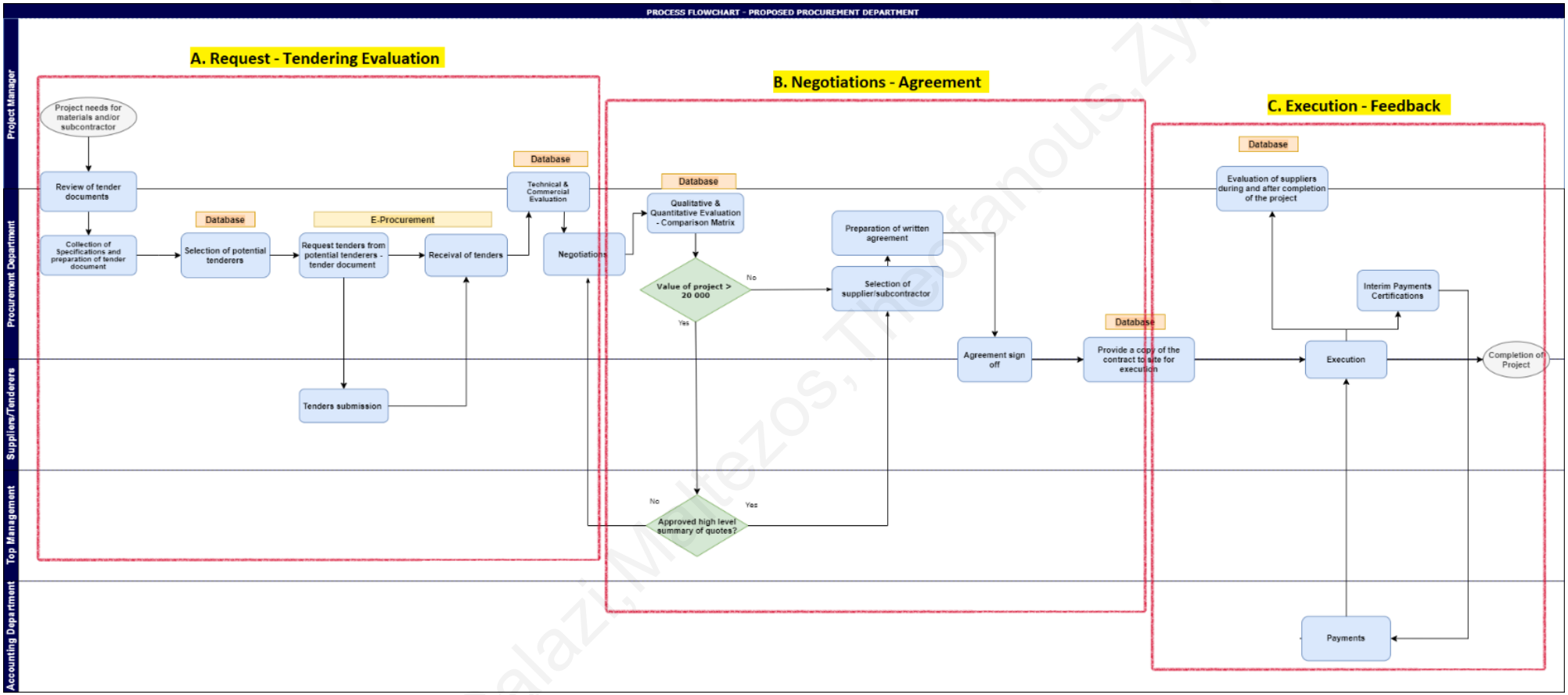
A. Request-Tendering-Evaluations

B. Negotiations and Agreement

C. Execution and feedback

The link of those three phases is shown in summary in the flow chart of Figure 2, along with the people and departments involved at each stage.

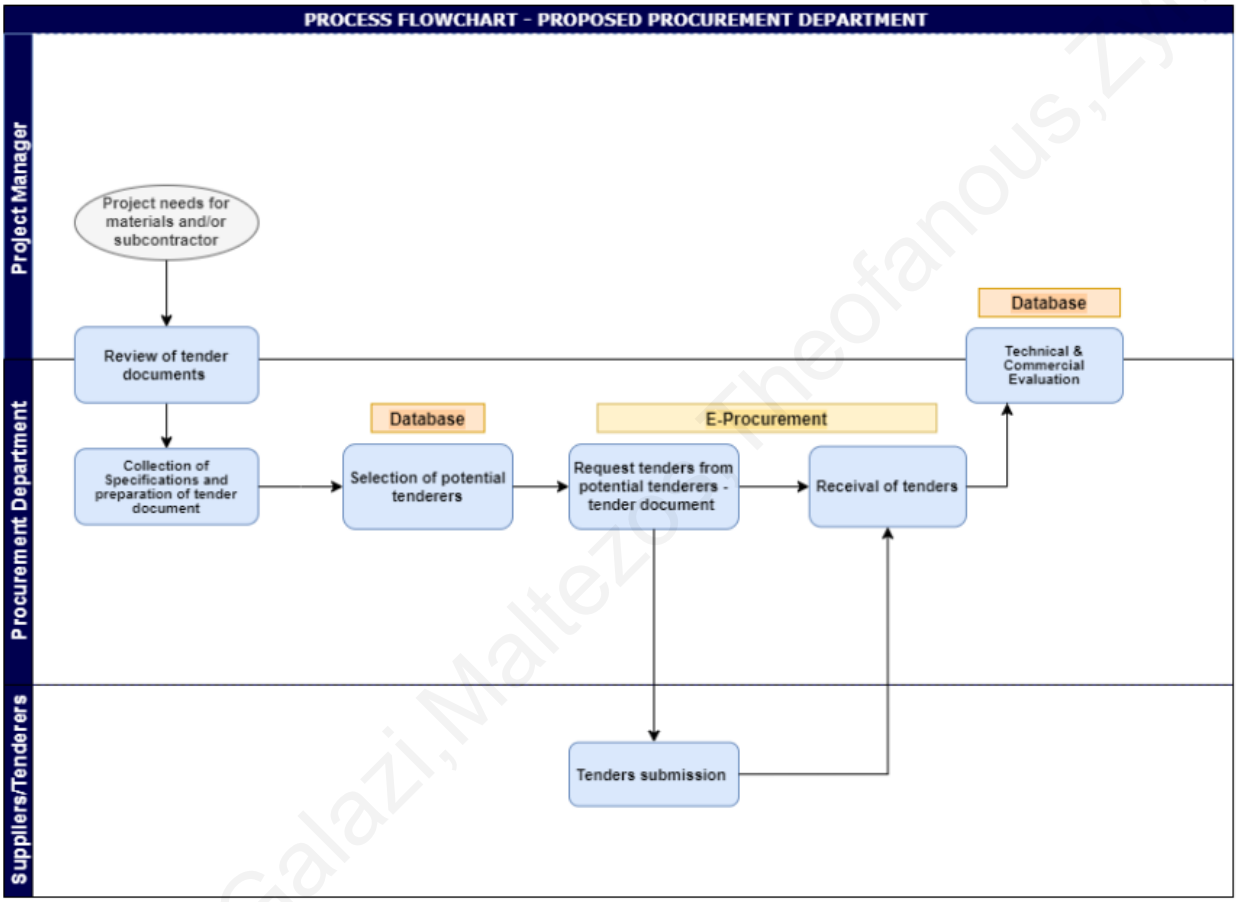
Figure 2: The proposed re-designed procurement process



A. Request - Evaluation of tenders and comparison

The procurement procedures begin from the start of the project. This can either be the signing of the contract with a client or the start of a Development Project, which is funded by Cyfield. In either case we have final drawings for the construction which can be used for procuring the materials and/or hiring subcontractors. Figure 3 below illustrates the first part of the re-engineering process of the PD.

Figure 3: A. Request - Tendering Evaluation



Once the need for procuring materials or services arises from the programme of the works, the Project Manager will send a digital request (see Appendix II) to the PD. This request should include at a minimum the following:

- Bill of Quantities (BoQ): This sheet includes the description of each product as well as the quantity of units for each product needed for construction. The BoQ is very useful in order to control the waste of material and order the right quantities. In that way, the company benefits from the economies of scale while procuring the total quantities needed rather than procuring in a number of smaller orders. An additional benefit of

developing BoQ is that the engineer reads the drawings in detail and understands the project better and is in a better position to manage its execution.

- Technical Specifications: A vital part of a successful procurement is to purchase the material with the correct specifications that fulfil the requirements of the project or the client. These specifications are generated by the designers (Architects/Interiors/Electrical/Mechanical) and the Project Manager in consultation with the client. Failure to collect this information precisely, result in inaccurate quotations and are very hard to compare as each supplier may have priced the same item with lower or higher specifications. Also, procuring the wrong materials can have significant cost implications for the company resulting in increase in wasting of materials and possibly re-works necessitate costly. One common example in the Developing Section is the procurement of Aluminium works. Aluminium works includes the doors/windows which have aluminium frame and glass in the inner space. In the market there are hundreds of different aluminium series (each has different weight and hence price) and also a lot of different types of glasses. Therefore, without precise specifications each subcontractor can provide you with a combination of specifications, which is not the same as the other tenderers, making it impossible to compare.

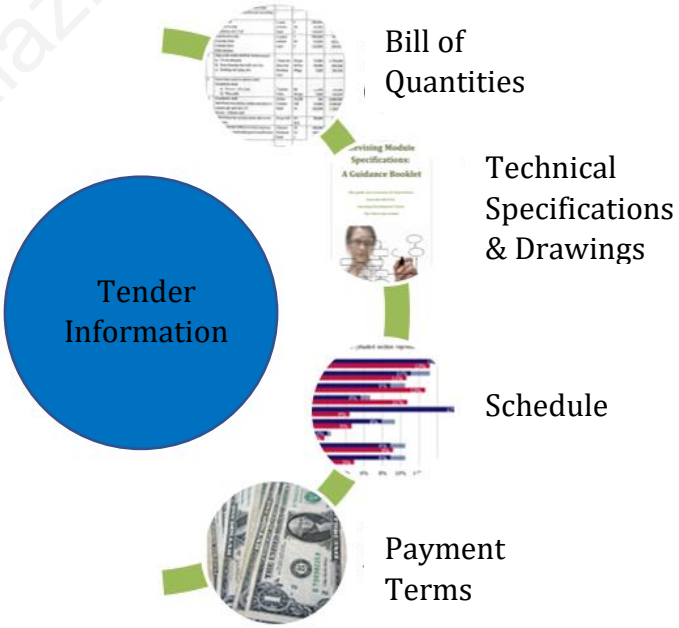
- Drawings: Integral part a comprehensive procurement procedure is collection of all the relevant drawings in the package that will be sent for tender. Including the drawings in the tender package can assist in the following ways:
    - Better understanding of the project by the supplier/subcontractor in order to provide an accurate tender taking into account the specific project
    - Supplier/Subcontractor can review the drawings and double check the quantities provided in the BoQ. This reduces the risk of wrong measurement or omissions which may result in additional work during the progress of the works.

- Schedule and timeline of Works: The starting and ending point should be clearly communicated to the supplier/subcontractor as soon as they are approached by the PD. That way, a subcontractor will be able to refuse to file an offer due to increased workload or lack of capability to perform due to various reasons. Moreover, the

Procurement team along with the Project Manager should be informed about those suppliers/subcontractors that work for Cyfield in different projects, at that given moment, in order to be aware of each one's workload within the Group of Companies. That way, several subcontractors may be rejected or approached, depending on their availability and already assigned projects within the business. This will enable the Project Manager to know whether the subcontractor will be able to respond to the project's deadlines with the relevant punctuality and quality of deliveries.

- Payment Terms: As in any other industry, the payment terms must be evidently communicated from the procurement stage. The payment intervals, the possible down payments and the retentions should be stated in the tender stage as this may affect the way the supplier/subcontractor will price the contract to secure its cashflow. For instance, for large packages (greater than 100,000) the supplier may require down payment to pay ahead its suppliers. By requesting a down payment, Cyfield will need a guarantee bond and maybe a performance bond which costs some money to the supplier. This cost needs to be taken into consideration by the supplier at the tender stage. Failure to communicate the payment terms at the tender stage results in misunderstanding and arguments in during the execution placing the project at risk.

Figure 4: Tender information to be prepared by the Project Manager

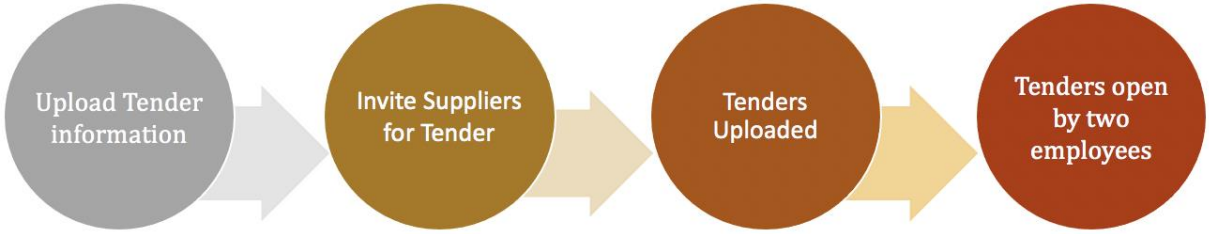


Following the collection of the tender documents, clearly shown in Figure 4, which will be submitted by the Project Manager, the PD will undertake a sanity check to confirm that there is no missing information. The next stage of the process is the selection of the potential tenderers to which the tender documents will be sent. The PD will have an electronic database in which all the suppliers/subcontractors will be documented with comments based on their performance from previous projects. For instance, a certain subcontractor may have low quality work in previous projects or may have previous issues with the company that resulted in breach of an agreement. On the other hand, though, the comments can be positive in terms of speedy delivery, quality of material/service, or high level of support. Appendices III and IV show the suppliers' and subcontractors' assessment forms, respectively.

Additionally, the Procurement team should be in a position to comprehend the size and complexity of a project and decide on which suppliers/subcontractors should approach for their offer in order to be capable of undertaking considering the financial status of the firm compare to the project size. These should be taken into account by the PD in order to select a list of competent contractors that can undertake the projects successfully.

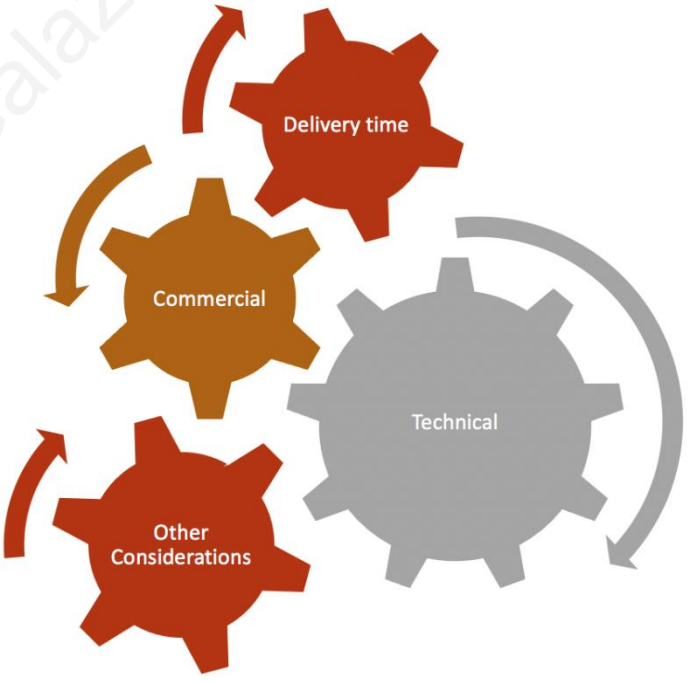
The invitation for tendering to the potential supplier/subcontractors will be sent electronically though the e-procurement that is proposed to be implemented as part of re-designing the procurement procedures. As shown in Figure 5, the process of e-procurement includes the upload of the tendering documents from the PD and inviting the qualified suppliers to provide their tender which receive a notification through e-mail and SMS. Once the tender is prepared by the supplier, then they will upload it on the website. For control purposes and for the avoidance of any misuse of the tender information submitted, all the received tenders will be opened at the same time in the presence of the Procurement Manager (with at least two people present). This control process also aims to protect its employees, in case of accusations of fraud, deception, or extortion of files. Once the offers are recorded, then they are passed to the Procurement Officers for further evaluations.

Figure 5: Flow chart for the process of e-procurement



For the thorough and fair evaluation of the tenders a series of people with different backgrounds need to work together. The technical evaluation of the tenders will require the input from a variety of personnel from Cyfield (i.e. Designers and Project Manager) and possibly external consultants, if needed. In addition to the technical evaluation, commercial evaluation needs to be undertaken to compare the total costs, the method of payments and the requirement securities for potential down payment requests. Also, evaluation of the financial strength of the supplier as well as the delivery time may be required for large scale projects of high value. If any information is missing from the tender submission, the PD will request further clarifications in order to have tenders with submissions that fulfil the requirements. All these evaluations, as shown in Figure 6, are compiled in a comparison matrix which will be used for the analysis between the tenders which will facilitate the negotiations which will follow.

Figure 6: Flow chart for evaluations of Tenders



B. Negotiations – Agreement with subcontractors

Following the evaluation of the available tenders, the PD should then start the negotiations. No agreement should be reached prior to the process of negotiating. The reason behind this is the fact that there are always margins that can be negotiated with the vendors for mainly achieving lower prices than the initial quotations, thus reducing the overall budget of the project. Despite the target of minimizing the budget of a project, in constructions deals, the game is not always about going with the cheapest price. There are other important elements such as quality standards, delivery time, payment conditions, after sales service terms etc. that need to be taken into consideration while negotiating.

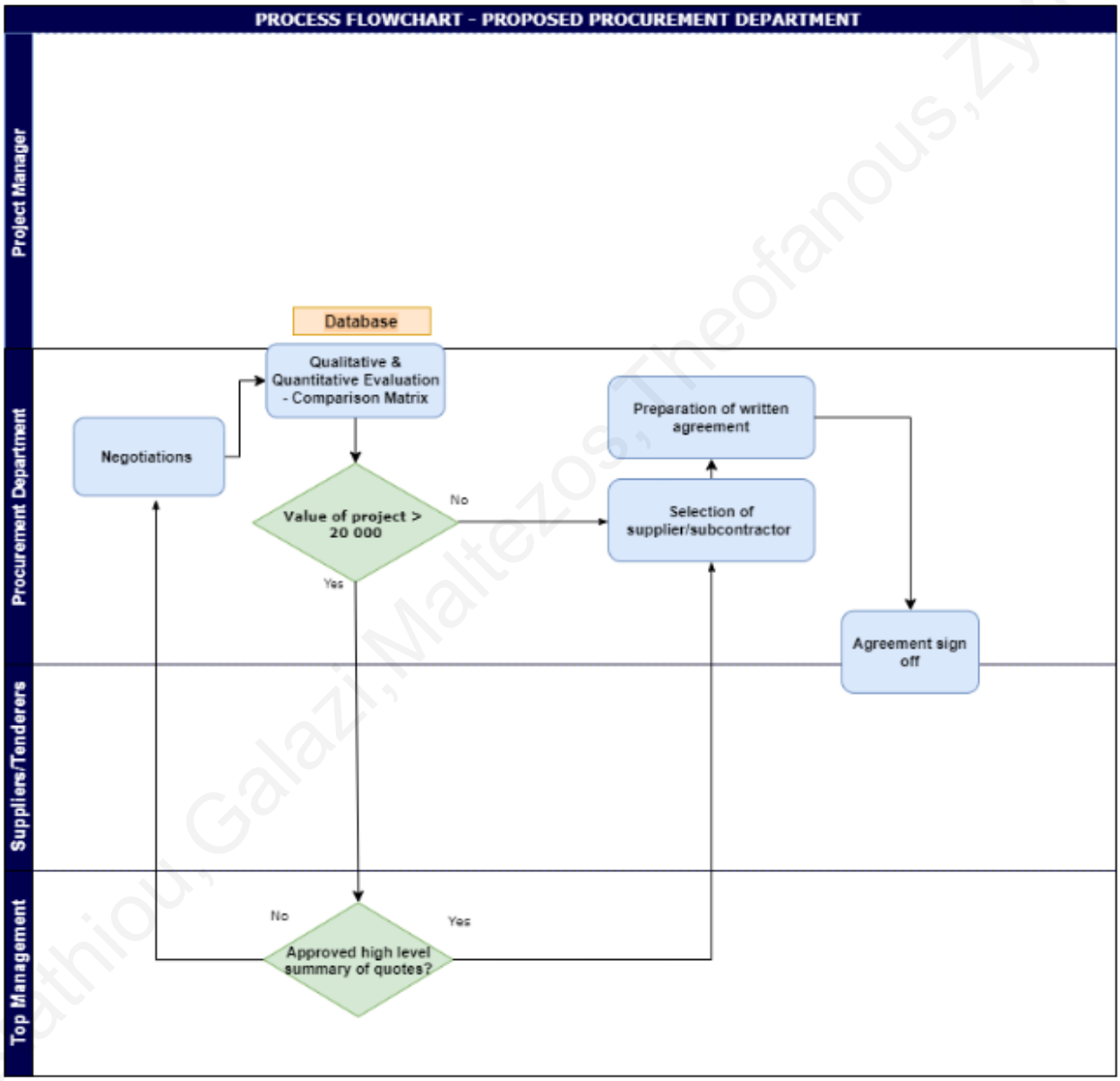
In the field of construction, the negotiations part is challenging and requires a competent person who has thorough knowledge of the industry and the elements that are being negotiated. Usually, the more tenders the negotiator gets the better understanding will have for the proper price of each package of procured works. Ideally, the initial invitation for the negotiations will be mainly sent by the head of the PD or others in the same department. The outcome of the negotiated terms should be then communicated to the senior management. Depending on the scale of each project, the senior management could also be involved for achieving even better deals. In order to avoid unnecessary delays, deals concerning smaller project could be made without the involvement of the top management.

Through an efficient procurement process, the business has the opportunity to achieve economies of scale. Especially in the part of negotiations, the needs of more than one projects could be combined resulting in requesting larger quantities or more services from the suppliers or subcontractors respectively. Bigger spend and greater purchasing leverage can result in decreased costs and prices, thus providing financial benefit.

After the end of the negotiations the winning supplier or subcontractor will be selected, and the agreement should be prepared for a sign off by both parties. All terms will be included in the agreement in compliance with all the legal elements and requirements. An effective communication process with the legal department should be established to ensure the cover of legal aspects of the agreement. Eventually, the agreement with the supplier will be signed off and then will be issued to site for execution.

The agreed prices of the agreements will be documented in the database. In this way, in upcoming projects the involved people from Cyfield will be able to review past agreed prices of items. Those prices could then be used as a reference for better estimation of projects total cost, negotiations, and deals with suppliers and overall planning. For instance, standard materials that are in use in various projects could have a predefined standard price for further negotiation. Figure 7 below shows the diagram of this stage.

Figure 7: B. Negotiations – Agreement



C. Execution of agreement and completion of works

After the completion of the signed agreements from the selected suppliers, the following phase of the proposed procurement system lies on the execution of the project. During the

execution stage, the PD must provide the agreements to the project manager in order to ensure that all activities and materials provided by the various suppliers and subcontractors are correct and that are consistent with the initial agreed plan. For instance, materials must arrive within the agreed timeframe along with the ordered type in order to avoid bottlenecks to the whole construction project.

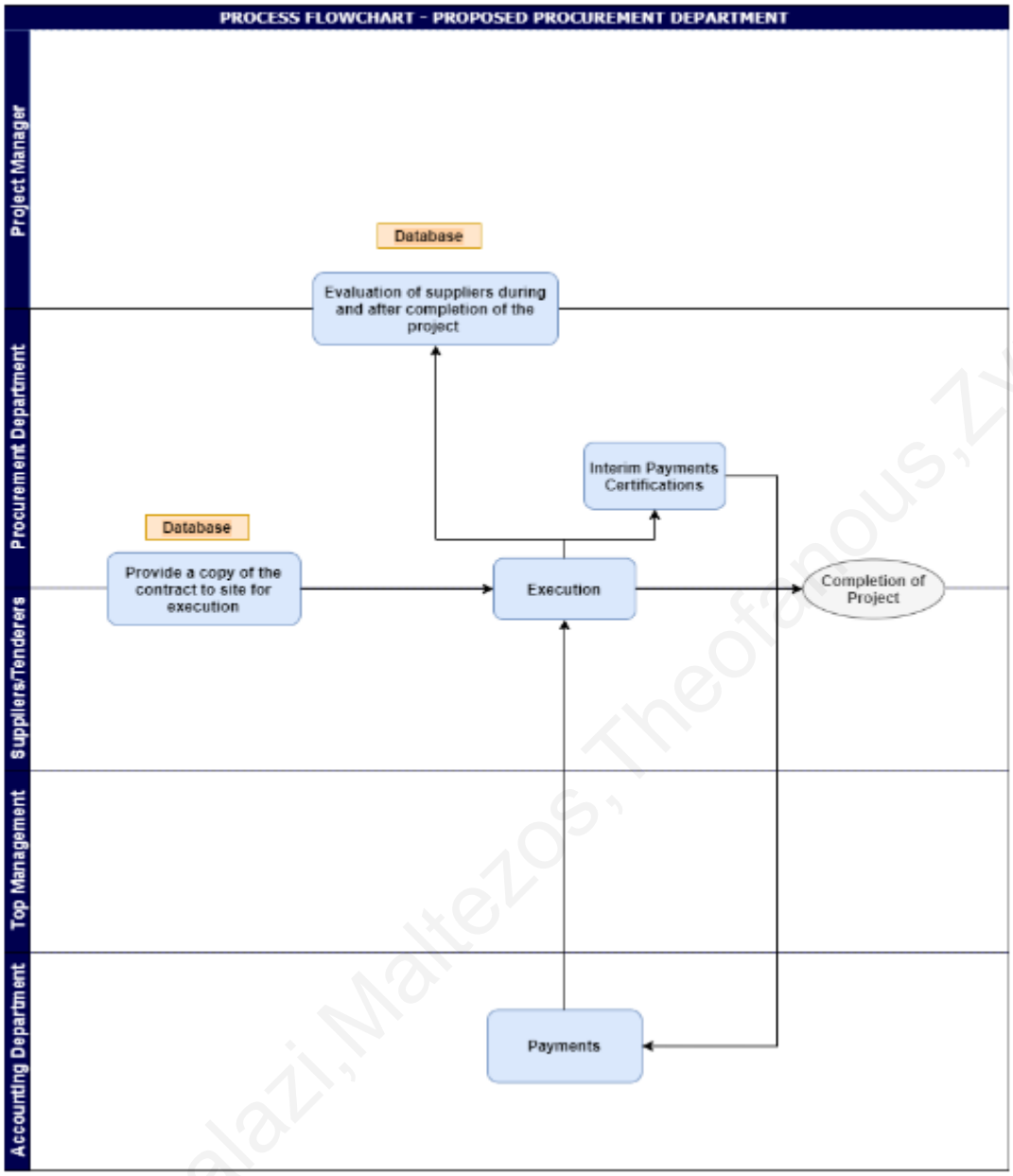
Accounting Department/payments:

During the execution of the project, the AD will require to validate the prices of the agreement as well as the agreed terms of payments. For this purpose, the PD must provide access to the agreement to the accounting department. As a result, the AD will therefore have a clear view regarding the subcontractors' involvement in the specific project as well as the total amount that the company owes to each one, thus fulfilling effectively the planning and monitoring purposes of the organization. Also, the AD must coordinate the site engineer or the project manager during the construction process in order to issue several payments to the various subcontractors or suppliers after the completion of their service. In particular, every two weeks, the AD must create a payment certificate for each subcontractor involved in order to issue down payments. Each payment must be correct and accurate based on the services provided by the subcontractors and the initially agreed unit price written on each agreement.

Complexity to the payments of each subcontractor arises from the extra work which is carried out during the construction. This extra work is only communicated with the project or site engineer and thus is not recorded in the initial agreement. As a result, it is up to the project manager to decide whether to proceed and approve the counteroffer of the current subcontractor. For audit purposes, the PD along with the AD must set a limit proportional to the original agreement in order to resolve this issue. For instance, an ideal scenario is that project managers or site engineers can accept offers for extra services in an individual event only if the amount does not exceed 1% of the original agreement. However, if the amount exceeds the limit of 1% of the original agreement, the offer must offer a sanity check by the PD in order to check the offer, confirm prices and audit the process.

Figure 8 shows a close-up of the third and last phase of the re-design of the PD.

Figure 8: C. Execution - Feedback



Evaluations:

Evaluating a construction project is an essential part of the planning cycle for various reasons. After the completion of the project, the project manager must evaluate the performance of the various suppliers or subcontractors that were involved in the construction. As in *Appendix II*, the evaluations forms must be completed right after the construction job is finished. As a result, the evaluation process will guide the organization to ensure that objectives are met, identify development needs as well as problems and weakness that need to be rectified, develop guidelines which will be used for other suppliers and subcontractors, and guide future plans. Moreover, the main purpose of the evaluation

process is to assist the PD to centralize the entire process in order to provide the service. In other words, the information that will be extracted from the evaluations will return back to an earlier stage, the selection stage, in order to examine the efficiency and performance of each subcontractor or supplier from previous completed work performances.

Furthermore, the evaluation process to assess the performance of each subcontractor or supplier will be driven by a number of factors including price, quality and standards of work or materials, payment terms, historical information from previous jobs within the organization, effective communication with project or site engineer as well as the overall service provided. In order to be effective, the evaluation process need to be embedded within the culture of each project manager or site engineer. Project managers are obliged to fill in the evaluation form for each type of subcontractor or supplier and return the form back to the PD in order to examine, analyse and record the performance ratings. As a result, the recorded data will eventually be an advantageous form of data to look for during a new selection of suppliers and subcontractors concerning the construction of a new project.

Stock Control and connection with warehouse:

Lastly, the proposed PD must record all the materials that were not used during the construction of each project. These materials will be transferred to the warehouse of the organization in an aim to be used for a future project. Inventory checks must happen systematically to update the stock in the warehouse. The PD must have access to the stock in the warehouse in order to continuously inform project managers or site engineers for the various materials that are left in the warehouse. Possible matches from new projects on several materials will eventually happen reducing the stock in the warehouse. As a result, by being able to connect to the warehouse and monitor the materials left from previous projects, the PD will aim to reduce the leftovers thus taking advantage of efficiency and waste by saving a great amount of money.

Chapter 4

IMPLEMENTATION ROAD MAP

The implementation of the new process and the establishment of the new PD is equally important as the design of the new process. A smooth implementation process can determine the success of the re-engineered process. Having a slow and effective implementation process will give time to the organization to accept the new changes and also provide adequate time to make relevant amendments required to resolve issues that they may appear in practice and not forecasted in the designing of the process.

Structure of the Procurement Department

For the proposed PD structure and procedures is vital that new employees that are exclusively working of PD are employed. Full-time commitment from the employees is required to build the department and provide resources to respond to the company's needs promptly to prevent bottleneck of the process affecting the projects. From times to times, the company allocated procurement responsibilities at hoc to Project Managers at times when they had less duties due to beginning or end of their current projects. This approach has been proven to be short-term vision which resulted in unsuccessful attempts to build this process through which employees has lost their faith in the implementation of this procedure.

The PD should be comprised of a Procurement Manager, an Administration Officer, and a Procurement Offices (PO). The manager of the department should have an engineering background, preferably with site experienced and technical knowledge. The ideal selection should be an existing employee that is aware of the companies' people and culture. They need to have the ability to accurately read and understand drawings and specifications as well as to communicate technical details with the Project Managers. Furthermore, the ideal candidate should have excellent negotiation skills. This person will be responsible for the

negotiation of large and significant tenders with subcontractors/suppliers, with the main goal to achieve a better monetary outcome for the company. He will also have the responsibility to review and sign all agreements made by the department. This main goal is one of the scopes of the implementation of the new process. In addition, he/she will need to be flexible, work under pressure, coordinate and prioritize the projects' tasks in order to avoid the creation of bottlenecks. Finally, the head of PD will have the "final saying" in every decision regarding the PD.

The position of the Procurement Manager plays an important role in every organization and, in this case, it will be of crucial importance for the successful implementation and viability of the new process. As identified in the interviews with the directors of Cyfield, the ideal candidate should be someone well-established that currently works for the company. This automatically implies that they need to be fully conversant with the cultural characteristics of the company as well as to recognize the key persons that they can rely on and who is appeared to be a resister to the idea of the new PD. This person will, then, be fully aware of both the current practices and the re-designed procurement procedures. The above characteristics and traits signify how a current employee is considered to be ideal for the position of the Procurement Manager.

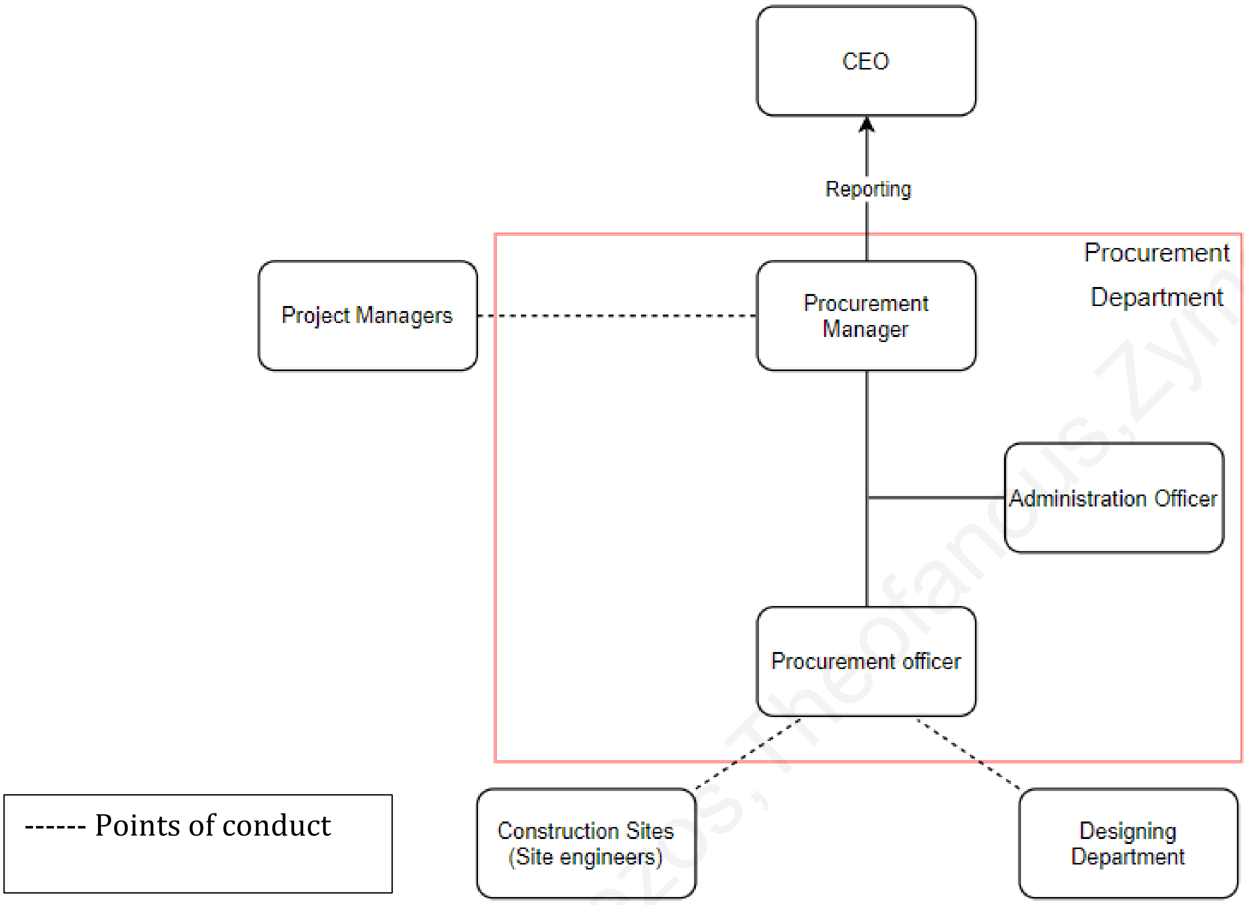
In general, the procurement manager will not have the duty to execute the process; however, they will be mainly responsible for the management and supervision of the process. They will assign tasks and responsibilities to their subordinates and guide them according to each project's requirements and company's priority. Therefore, they may be the only person in the department with other responsibilities as well. More preferably, he could be the current head of Tendering Department as well. The Tendering Department has the responsibility to collect data from subcontractors and suppliers at the stage of tendering and not at the execution, where more detailed data and negotiations are required. Hence, since the responsibilities of the Tendering and Procurement departments are related and complementary it is derived that the head of the two departments could be the same person.

The PD should also have its own Administration Officer. This person is not required to have any specific technical knowledge or specialized qualifications, but indeed to have some excellent organizational skills. They will be the middle step between the PD and the projects. They will receive requests from the project managers regarding suppliers and

subcontractors and they will forward them to the PO of the department. In addition, after the contract signing from the PD manager, they will forward the agreement to the project managers. So, the project managers, will have the agreement with the successful subcontractor/supplier and will get in touch with them, in order to agree the time and sequence of each deliverable.

The PD should also have a third employee – the Procurement Officer. This employee should come from a technical background preferably a Quantity Surveyor. They will be responsible to receive the drawings and the specifications from the construction sites and/or the tendering department and, therefore, they should be in a position to understand the technicalities of every tender, before requesting the price from the subcontractor/supplier. Also, they will be responsible to communicate with other employees of the Group, who work for the Design Department, in order to share their field of expertise. These employees may be mechanical, electrical engineers, architectures or interior designers. Additionally, the PO will closely collaborate with the Procurement Manager in order to make sure that the specifications that are sent and received from subcontractors and suppliers are correct. They will also present all tenders to the head of the department, who will have the duty of negotiations.
Figure 9 below summarizes the structure of the proposed PD and its links with the other departments in the company.

Figure 9: Organizational structure of PD



Before the implementation

Before commencing with the implementation of the new process, the new PD some preparation will be required. Firstly, a database software should be developed to cover the needs of the Company in regards to recording the names and contact details of all the suppliers and sub-contractors. Then, the database, should be filled with data to start working with. As mentioned before, one of the main objectives of the PD, is to widen the spectrum of suppliers and subcontractors to bring more players in the game. However, at the beginning, some data are required to commence working and then more and more information will be added.

The administration officer of the PD will request from project managers to make a list with all suppliers and subcontractors that are currently collaborating at their projects and their area of expertise. Them they will be listed in the new system, in order to be able to start the

implementation of the new process. When the new database is ready, the transition period will be able to start.

Transition Period

The restructuring of PD within the organization and the implementation of new processes cannot happen abruptly. A sudden and holistic change on the procurement practices will potentially shock the organization, create bottlenecks and eventually fail. The need for procurement will emerge from every department of the Group of companies and it will normally vary daily. Therefore, a horizontal application of the proposed system, throughout the companies of the organization, would practically fail, as it entails a severe amount of risk. Cyfield under the current procurement procedure, is one of the leading companies in the construction industry and dramatic changes on the working style can influence its performance detrimentally.

The need for a transition period is essential. Considerable changes within organizations should occur smoothly in a way that allows the management team to evaluate each step of the proposed process, detect errors or problems, and improve or resolve them. In addition, the people in the organization will also need to adjust in the new reality. Until now, ad-hoc procurement departments were established for every project under the Project Manager's duties. People will need time to adjust to the new proposed centralised system and learn to work with it.

Generally, there are different views regarding the way that the company would smoothly acquire and implement the new system of a PD. Firstly, considering that one of the main benefits of the new system is the economies of scale, the PD cannot include only one or two projects, to begin with. Although this could be the safest way, it is also the slowest one and it could degrade the benefits of the new system. In addition, it would not allow possible problems to come on the surface. Operating with an insignificant number of projects implies that the workload of the department would be very low, possible bottlenecks would never appear, and basic benefits of the proposed process would not be apparent. Therefore, the evaluation of the centralized system would take too long to meaningfully appear for feedback.

Pilot program on Development Department

For the aforementioned reasons, it was decided that the new PD would begin its implementation with the projects of an entire department of the company. That way, the measurement of the benefits of the economy of scales will be possible and the workload of the PD will be adequate in order to determine and identify the situation of incorporating the rest of the departments. The Development Department is ideal because, at any given moment, includes projects in different stages of their construction cycle and in approximately three months the PD will have handled the procurement of every stage of a project of Development. This will allow the PD to recognize both the benefits and errors of the new system.

However, the application of the proposed procedure regarding the projects of an entire, and crucial for the firm, department implies that more measures should be established in order to minimize the risk of failure or delays that may emerge. This means that the project managers should work closely with the new department. The PD is responsible to identify the suppliers and subcontractors, negotiate with them, reach agreements, and complete the tasks. However, the Project Manager of a project should assist them during this pilot period as well as provide them with adequate support in order to avoid delays or mistakes. Everyone should keep in mind that Cyfield needs to maintain its high standards of performance and credibility of deliverables.

Pilot Business Unit - Development Department

The Development Department is not randomly selected to work under the new process during the pilot period. This choice minimizes significant risks too. The Development Department undertakes projects that belong to the company, before being sold to their permanent owner. This means that, during the construction process, there is not a third-party involved for the supervision of the quality and the time management of the process of the project. Therefore, minor weaknesses that may occur will not cost time or money to the firm. In addition, before the sale of the projects, the company does not need to suffer any penalties because of delays in completing the projects. This is not the case for the Contracting Department and the other departments of the company.

Furthermore, at the Development, where the designing of the project is made by organizations' employees, the management can make decisions that will give the possibility

to the PD to take extra advantage of the economies of scale. For instance, the doors or cuisines of different buildings can be the same. This means, that the proposed procedure is more essential at the Development Department. Furthermore, Development, is related with the construction of buildings (from houses to multi-storey buildings), which implies different suppliers and subcontractors. Some of them may be related to common supplies or works and some of them may be related to specialised ones. Therefore, Development has the advantage of less supervision, but is related with many things that will be under PD. That way, results will be realistic and a successful implementation of the proposed process at the development will give the impetus for the implementation at the rest departments.

The sole implementation at the Development Department should last six months. During this period, both benefits and weaknesses of the new system will come to the surface and there would also be time to fix them. For sure, new mechanisms will be implemented in order to correct weaknesses that could not be detected before the pilot stage of implementation. At the end of the pilot period, the PD should work properly and serve the development department.

Adopting PD in Contracting – Building

At this time, the new PD includes the projects of Building sector of the Contracting Department. Contracting is divided to building projects (houses to multi-storey buildings and malls) and infrastructure projects (roads, sewerage systems, power stations etc.) The building sector of contracting is similar to Development. The main differences are the third-party supervision that the owner (government or private party) will recruit in order to supervise the quality of the job. Also, timeframe with penalties will also be applied and probably there will also be more specifications regarding the suppliers and the subcontractors. However, after the successful implementation of the proposed process at the Development, a period of three months will be enough for the new PD to include Building sector of Contracting. For sure, Project Managers should also assist where is needed in order to fix problems and find solutions during this period.

Adopting PD in Contracting – Infrastructure

Until this stage, the new PD has included at the Development Department as well as the Building sector of Contracting. The next stage is the implementation of the new process at

the projects of the Contracting, within the new PD. Infrastructure projects are different from the building projects, regarding procurement as well. The subcontractors and suppliers that will be needed will be much different than those at the building sector. Technical projects for example, are usually related to huge earthworks and may need more specialized suppliers and subcontractors.

The actual work that would have been completed by the PD for the implementation at the Development Department will not be very useful at this stage. Specifications and supervision from the third party or the Government's departments are very strict and demanding. However, the knowledge and the experience that would have been acquired will help them to achieve a successful implementation of this stage as well. An important advantage of this stage is that some of the required products or services for the completion of a project are produced within other departments or companies of Cyfield Group. This automatically implies less workload for PD.

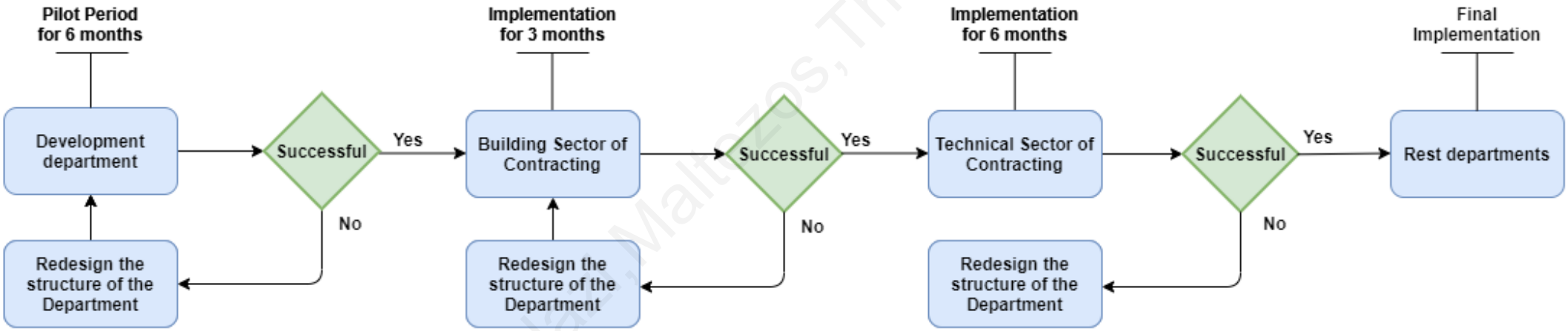
The implementation stage at the infrastructure projects will take approximately six months as well. If this stage is completed successfully, then the new PD will have taken care for the procurement of the biggest and most important departments of the company.

Final step of implementation

The last step is to manage the implementation of the other Business Units which serve the Development and the Contracting as well as external clients. These Business Units include the Concrete Batching Plan, the Quarries, the Asphalt Plant and the Pre-cast concrete factory. These departments have less complexity, because they limited suppliers and subcontractors to work with them; however, they need specialised staff that is in shortage in the market. When the previous steps of implementation are completed, then the last stage will face insignificant barriers. At this point, the management of the organization should also decide whether the new PD will also expand its duties the procurement procedures for daily replenishing purchases of the company, such as stationery or supermarket supplies.

Figure 10 below illustrates the schedule of the project and each Department's incorporation to the larger procurement scheme. The chart allows Project Managers to view the exact duration of each procurement stage and the related department for each phase.

Figure 10: Schedule of departments' incorporation to PD



Auditing

Despite the road map of implementation and the detailed guidance, without auditing that the new process is being implemented as it has been designed, there is the danger to implement parts of the new procedure, or even worse, go back to the previous procedure. People by default, always try to find the easiest way to do their job and they may try to bypass some steps of a process which makes the auditing of the new procedure a crucial part of the management of the organisation.

There are different mechanisms to check and certify the new process. These mechanisms can be separated to reporting as well as spot and regular checks. Reporting is the simplest and first step. The PD should create a report every two weeks. This report, which can be created by the Administrator Officer and checked by the manager of the department, should include a table with the needs of the ongoing projects, the pending tenders, and the agreements that were signed. In this way, management can see the wider picture of the procedure, check if new possible collaborators are being asked for a tender, and whether agreements are being signed for every collaboration.

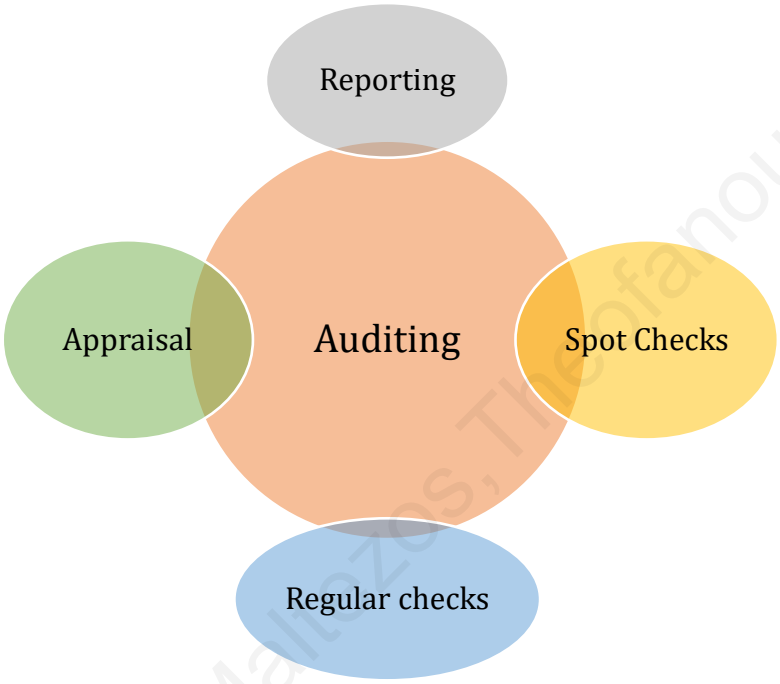
The next step of auditing the new procedure are the spot checks. This type of auditing, is the most important and despite that includes only a small part of the load of the department, can give the clearest picture of the situation. Spot checks can be identified as the procedure where the management will pick an ongoing project and check all the steps that had done regarding the procurement. The tenders that were asked, the agreements that were signed, the parameters, that were included in the agreements regarding down payments etc, should be part of this type of detailed check.

Another way to audit the new procedure is the regular check. Once every month, the management should check the procedures that were followed for specific tenders. This type of check will not be as detailed as the spot checks. It will control and check that every step was followed according to the documentation of the department. It would not be possible, otherwise, to check the width and the effort that was included in every step, the negotiations that were carried out, etc.

Reporting, regular and spot checks as a whole can audit the successful implementation of the procedures. Especially at the beginning, auditing can help to identify misunderstandings and

deficiencies in order to improve the process of PD. Furthermore, the appraisal of the PD can play a significant role for the success of the department. KPIs of the department should be related according to the collaborations with new suppliers and subcontractors, the results of their negotiations, and the avoidance of potential bottlenecks. Figure 11 shows the audit procedure.

Figure 11: The plan for Auditing the new PD procedures



Chapter 5

FINANCIAL IMPACT

For Cyfield Group, a leading construction company operating in the Cyprus market, the financial aspects derived from the implementation of the new centralized procurement system can play a vital role in the progress of the business. The analysis of the financial aspects reveals important information for the company to consider during the implementation of the new system as well as specifies the annual operational expenses that are necessary to meet. In addition, an effective analysis of the financial aspects will guide the organization to an effective decision making in order to grow the company more quickly. Also, financial information goes one step further to provide and interpret the results in order to see whether the company is performing well by gaining a competitive advantage while saving money by reducing the operational expenses. The goal of the financial information is to ensure that the company makes the most efficient use of its finite resources including capital, human resource, and productive capacity.

Annual expenses

Table 2: Total cost for the implementation of the procurement

Application	Type	Parameter	Quantity	Per unit price	One-Off	Yearly Cost
Procurement Department Cyfield Group of Companies	**Software**	**Database Software**	**-**	**-**	€ 10,000	-
		Support & Maintenance Cost			-	€ 1,000
	Hardware / Infrastructure	**Working Stations - laptops**	3	€ 500.00	€ 1,500	-
		Office Supplies	-	-	-	€ 100
		Other Equipment (Printers etc.,)			€ 3,000	-
	Personnel	**PD Manager**	1	-	-	€ 32,500
		Administration Officer	1		-	€ 26,000
		Quantity Surveyor	2		-	€ 26,000
	TOTAL				**€ 14,500**	**€ 85,600**

Table 2 indicates the total cost for the implementation of the procurement department in Cyfield. The main three areas that the company should invest money will be the software purchase and maintenance, the setup of the hardware and infrastructure and the employment of personnel to ensure sufficient staffing levels for the department. The cost is classified in one-time costs and recurrent costs. The one-time costs entail the purchase of the procurement software, the laptops, and other equipment. The support and maintenance of the software, the office supplies, and personnel cost are recurrent expenses that the company will have to pay on a yearly basis.

Table 3: Total amount of investment

Year 0 - total cost	**One-off & Running cost**	**€ 100,100**
Year 1 - total cost	**Running cost**	**€ 85,600**
Year 2 - total cost	**Running cost**	**€ 85,600**

As shown in Table 3 the total amount of investment for the starting year will be a total of €100,100 and for the next years a recurrent cost of €85,600.

Return of investment – Project savings

The main impact of the new centralized system will be the decrease of the expenses of the company rather than bringing extra profits. In particular, it is projected that there will be a significant saving of the Project Managers' time, as they will reduce the time needed, with the current structure, to complete the procurement operational tasks. This saved time could be utilized in other operational tasks which could bring extra additional profits to the organization.

Table 4 below presents the salary of a Project Manager. Currently the company employs 6 project managers. It is estimated that the new PD will save approximately two hours per day for each manager. Based on the figures below it is derived that the total hours saved for a year will be 3,120 hours which is translated into more than €68,300 cost saving.

Table 4: Personnel savings

Manager's Salary	Per year	Per month	Per day	Per hour
	€ 50,000	€ 3,846.2	€ 174.8	**€ 21.9**

Project Managers Time consumption saving & cost benefit	Current project managers	Total hours saving per day	Total hours saving per year	Total cost saving (€)
	6	**2**	3,120	**€ 68,328**

Another benefit of the centralised system is the cost reduction of the subcontractors and materials costs which constitute a part of the turnover cost of the company, clearly shown in Table 6 below. As described in the previous sections, the utilization of economies of scales and the other benefits of the new department will offer a reduction in materials and subcontractors. This reduction is an estimated percentage of 0.5% of the total material and services current cost. This decrease of 0.5% results in a significant cost saving amount of €500,000 which is projected to be achieved each year, as illustrated in Table 5.

Table 5: Materials & Subcontractors savings

Materials & Subcontractors cost	Estimated saving %	Cost reduction in first two years
100,000,000	0.5%	**€ 500,000**

Table 6 demonstrates the aspect that the total cost's amount is the 0.07% of the current materials and subcontractors' cost. From the calculation below it is evident that the estimated cost saving amount from the materials & subcontractors' costs is greater than the total cost of the implementation of the PD. As a result, the company will be benefited from the new proposed procurement procedures.

Table 6: Total cost % of Materials & Subcontractors cost

		Total Cost	Total cost's % of Materials & Subcontractors cost
Year 0 - total cost	**One-off & Running cost**	**€ 100,100**	**0.1%**
Year 1 - total cost	**Running cost**	**€ 85,600**	**0.086%**

Chapter 6

CONTINGENCY PLAN

The development and implementation of a new centralised system within the PD of the organization can lead to huge cost savings for Cyfield. However, in order to be successfully implemented, a solid contingency plan is required in order to reduce disruptions, develop multiple strategies to mitigate risk, and, thus, sustain the supply chain flow. Contingency planning is the preparation of organisations to deal effectively with exceptional or unforeseen risks. In particular, organisations develop a contingency plan to respond quickly and resolve several potential barriers to successful implementation, which may have a detrimental impact in the event of their occurrence. Table 7 shows the contingency plan for the PD of Cyfield Group.

Table 7: Contingency Plan

Event	Likelihood of Event Occurring	Impact on Business	Solution to Deal with Event
Failure of the system	Moderate to Low	High	Any possible failure to the system must be resolved with a fully detailed manual process plan, which will be provided to the PD in order to continue its operations until the centralised system is stable again. However, the likelihood of this event is relatively moderate to low, as the PD will have continuous support from external developers in resolving several issues that might appear. In particular, the system will have systematic support by developers and will be updated regularly in order to avoid this failure. Other simple policies such as turning off the devices that are not used, or even unplugging devices during storms and implementing procedures on downloading files through other devices will also help to reduce this system failure.

Resistance to change from employees (cultural change)	High	Medium	Resistance to change in order to keep up with new obligations and procedures in supporting the centralised system is a high event to occur within the organisation. Employees are generally negative to changes that disturb their routine and obliges them to learn and apply new processes. In order to resolve this issue, top management must define the scope of the new PD with giving clear objectives and strict instructions to all project managers. Top management should be fully committed with the new process. Cultural change and the effectiveness of new processes and procedures solely relies on the top management of the organisation. roc, in order to minimize the resistance to change of key employees, they should be part of the redesign of procurement. If they are part of the change, is more likely to stand for it.
Resistance to change from subcontractors or suppliers	High	Medium	Subcontractors and suppliers that are currently collaborating with the Group, may find difficulties to adjust with the new procedure. The PD must assist them in order to get familiar with the new system. In addition, some of them have good relationship with some project managers and enjoy their preference. Project manager should help them to bypass the new project, even if they are doing it in good faith.
Bottlenecks	High	High	In order to avoid this event until it is resolved and eliminated, the department must prioritize the tasks to identify critical tasks that must continue to be done. The company must ensure that staff members are trained well on the critical tasks of the department in case to temporary eliminate a possible bottleneck to the process which may create huge delays to the procedures of the organisation
Unauthorised access	High	High	Unauthorised access to the centralised procurement system can happen both internally or externally and can have terrible impact for the database of the company. When someone gains access without the authorisation, data can be stolen and later on used in contradiction to harm the organisation. In order to minimise the likelihood of this event, the company must continuously monitor the privacy and security mechanics of the system in order to make sure that unwanted people cannot log

			in to the system. Also, system administrators can set up alerts in order to let them know when there is an unauthorised access attempt, so they can investigate the reason. The use of alerts can also help to stop hackers from gaining access to a secure or confidential system. Moreover, users that have many failed attempts to login to the system must be locked until the department investigates the possible reasons of failure.

A systematic strategic approach on continuously reviewing and regularly updating the contingency plan of the new centralised procurement system will help the organisation implement an effective procurement system. The company must be able to understand that a detailed and solid contingency plan aims to eliminate hazards, control damages and risks that can impact the successful completion of the procurement system.

Chapter 7

CONCLUSIONS

Through the investigation and evaluation of the current procurement practices within Cyfield it became apparent that the current effectiveness relies primarily on the commitment of some key personnel within the company that are undertaking the procurement role as part of their projects. As the company is growing exponentially over the last 30 years, it is vital that a re-designed and electronically based procurement process is implemented. This is expected to have significant benefits to the company both in terms of reducing its purchasing costs as well as allowing more time for the Project Managers to focus on delivery.

The proposed process is structured in a way that takes into consideration the culture of the company and the existing practices in an attempt to minimize the disruption of existing practices during implementation. As a digital advancement, the proposed process recommends the use of e-procurement in order to provide high security, reliability as well as transparency of the process to ensure smooth operation without any potential fraud.

To ensure smooth implementation of this re-designed process and to prevent bottlenecks to the running projects, this will firstly be implemented into the Development Business Unit which is less risky in terms of specification and timeframes compared to the contracting and Government Projects. The implementation process will take adequate time in order to receive feedback and potentially adjust the process in order to be efficient and effective before is implemented to the entire company.

The implementation of the proposed process requires a lot of effort from all people that are involved, from the new PD and the project managers. However, if they manage to implement it the company will have many benefits. Benefits will be financial and organizational. The company will manage to get advantage of economy of scale. In addition, the more effective

negotiations that are being established will result in more beneficial deals, with the same deliverables. The goal of finding new collaborators will result in better market research and eventually more financial collaborations for the company. Finally, regarding the financial part, the official and stable procedures that are being established will give the chance to the top management of the company to have better control regarding the payments and the future expenses.

The company will not only enjoy financial benefits. The successful implementation of the proposed procedures will also result in improvements regarding deliverables. The rating of the potential suppliers and subcontractors will result in better collaborations, with successful professionals. In this way, the projects will be completed on time and with more efficient results. Furthermore, the saved time of Project Managers allows them to spend more time on the quality of the deliverables. Both of the above will improve the deliverables of the company, which naturally entail satisfied customers, improvement of the reputation and the goodwill of the company, and eventually more potential customers. According to the proposed procedure, the company will always have formal, signed and agreed agreements, that will minimize misunderstandings with suppliers and subcontractors. In addition, the proposed system, will result in the avoidance or minimization of fraud. The well–established, electronic and official procedures, will provide with less opportunities to fraud. In that way, people that are engaged in procurement are being protected of accusations for fraud.

The implementation of a re-designed procurement process in Cyfield is of paramount importance. The existing practices have been effective for a family business scale company. Unless they are adopted and improved by a structured PD, the company runs with a lot of risks. For all the above reasons, a PD is vital for Cyfield's survival. Every change requires a lot of effort from everyone that is engaged to be completed. It is people's nature to resist to change. However, with everyone's good faith and effort, the successful implementation of the PD, will open new horizons for the company and will beneficiated it, in multiple ways.

APPENDICES

Appendix I

Discussion prompts for Cyfield Directors' interviews

"Introduction**:**

1. What is your current position in the Group and what are your main responsibilities?

Current practices**:**

2. What do the current practices of procurement in the company entail and how is this implemented?
3. What are some of the advantages of the current procedure?
4. What are some problems that you identify in the current practices? What are the bottlenecks in the procedure?
5. How would you like the current system to be improved?

New procurement procedures/re-design**:**

6. What has it changed towards the direction of the improvement? In what way were you involved?
7. How would you visualize the new system?"

Appendix II

The procurement request of the Project Manager to the PD

CYFIELD Group of Companies	**Procurement Application Form - P1**	
	PROCUREMENT DEPARTMENT	Issue Date:
	1st edition	Page 1/1

General Information	
Date of issue of application	
Application Code	
Project	
Company	
Deadline for date of signing of an agreement	

Contact Person	
General Information	
Technical Information	

Product/Service Description

Required Forms	
Drawings (in pdf)	
Bill of Quantities (in Excel)	
Technical Specifications	
Schedule for completion of works	
Warranty Time	
Recommended subcontractors	

Appendix III

The supplier's assessment form, after the completion of an agreement

CYFIELD Group of Companies	**Supplier Assessment Form - S1**	
	PROCUREMENT DEPARTMENT	Issue Date:
	1st edition	Page 1/1

	Criteria	Weight	Score (1-5)	Score	Comments
1	Price	50%			
2	Payment terms	10%			
3	Product Quality & Specifications	10%			
4	Service / Distribution & Delivery / Immediacy	10%			
5	Relationship & Communication	10%			
6	History with Company	5%			
7	Volume of cooperation	5%			
	Final Score	**100%**		**(H/M/L)**	
	Final Score: **H**igh (H): ≥ 60 - **M**oderate (M): ≥ 50 - **L**ow (L): ≥ 30				

	Comments:		
	Quantity Surveyor:	Signature:	Date:
	Head of PD:	Signature:	Date:

Appendix IV

The subcontractor's assessment form, after the completion of an agreement

CYFIELD Group of Companies	**Subcontractor Assessment Form - S2**	
	PROCUREMENT DEPARTMENT	Issue Date:
	1st edition	Page 1/1

	Criteria	Weight	Score (1-5)	Score	Comments
1	Price	30%			
2	Quality of works	30%			
3	Keep to schedule	10%			
4	Strategic requirements (extra costs)	10%			
5	Health & Safety at Sites / Legality	10%			
6	History with Company	5%			
7	Adequate staff	5%			
	Final Score	**100%**		**(H/M/L)**	
	Final Score: **H**igh (H): ≥ 60 - **M**oderate (M): ≥ 50 - **L**ow (L): ≥ 30				

	Comments:		
	Quantity Surveyor:	Signature:	Date:
	Head of PD:	Signature:	Date:

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